In the Claims:

Please amend Claims 4 and 9 and add new Claims 18-28 as indicated below. The status of all claims is as follows:

1. - 3. (Cancelled)

4. (Currently Amended) A method of determining a magnitude of a sensing current to be supplied to an electromagnetic transducer, comprising:

supplying an electric current of a first current value to the electromagnetic transducer;

determining a physical quantity appearing in the electromagnetic transducer based on the electric current of the first current value;

supplying an electric current of a second current value, different from the first current value, to the electromagnetic transducer;

determining the physical quantity appearing in the electromagnetic transducer based on the electric current of the second current value;

deriving a variation in temperature of the electromagnetic transducer based on the change in the physical quantity;

determining the magnitude of the sensing current based on a derived variation in temperature of the electromagnetic transducer; ~~and~~

deriving an expected lifetime of the electromagnetic transducer based on the variation in temperature when determining the magnitude of the sensing ~~current.~~ current;

comparing the expected lifetime with a predetermined target upper limit lifetime; and

adding an incremental value to a preceding second current value so as to set a new second current value if the expected lifetime takes a value ~~below~~ exceeding the predetermined target upper limit lifetime.

5. (Original) The method of determining according to claim 4, wherein said predetermined upper limit lifetime represents a sum of a minimum lifetime required to the electromagnetic transducer and a margin to be added to the minimum lifetime.

6. (Original) The method of determining according to claim 5, wherein said incremental value is stepwise reduced as the preceding second current value gets larger.

7. - 8. (Cancelled)

9. (Currently Amended) A method of determining a magnitude of a sensing current to be supplied to an electromagnetic transducer, comprising:

supplying an electric current of a first current value to the electromagnetic transducer;

calculating a first electric resistance value of the electromagnetic transducer based on a first voltage value appearing in the electromagnetic transducer in response to supply of the electric current of the first current value;

supplying an electric current of a second current value, different from the first current value, to the electromagnetic transducer;

calculating a second electric resistance value of the electromagnetic transducer based on a second voltage value appearing in the electromagnetic transducer in response to supply of the electric current of the second current value;

calculating a quantity of variation in temperature of the electromagnetic transducer based on the first and second electric resistance values; ~~and~~

determining the magnitude of the sensing current based on a calculated quantity of variation in temperature of the electromagnetic ~~transducer and;~~ transducer;

deriving an expected lifetime of the electromagnetic transducer based on the quantity of variation in temperature of the electromagnetic transducer when determining the magnitude of the sensing current;

comparing the expected lifetime with a predetermined target upper limit lifetime; and

adding an incremental value to a preceding second current value so as to set a new second current value if the expected lifetime takes a value ~~below~~ exceeding the predetermined target upper limit lifetime.

10. (Original) The method of determining according to claim 9, wherein said predetermined upper limit lifetime represents a sum of a minimum lifetime required to the electromagnetic transducer and a margin to be added to the minimum lifetime.

11. (Original) The method of determining according to claim 10, wherein said incremental value is stepwise reduced as the preceding second current value gets larger.

12. - 15. (Cancelled)

16. (Original) A method of determining a magnitude of a sensing current to be supplied to an electromagnetic transducer for reading data, comprising:

supplying an electric current of a first current value to the electromagnetic transducer for reading data;

determining a physical quantity appearing in the electromagnetic transducer for reading data based on the electric current of the first current value;

supplying an electric current of a second current value, different from the first current value, to the electromagnetic transducer for reading data;

supplying an electric current of a predetermined current value to an electromagnetic transducer for writing data, which is paired with the electromagnetic transducer for reading data;

determining the physical quantity appearing in the electromagnetic transducer for reading data based on the electric current of the second current value; and

determining the magnitude of the sensing current based on change found in the physical quantity.

17. (Original) The method of determining according to claim 16, further comprising:

calculating a first electric resistance value of the electromagnetic transducer based on a first voltage value appearing in the electromagnetic transducer in response to supply of the electric current of the first current value;

calculating a second electric resistance value of the electromagnetic transducer based on a second voltage value appearing in the electromagnetic transducer in response to supply of the electric current of the second current value; and

calculating a quantity of variation in temperature of the electromagnetic transducer based on the first and second electric resistance values in determining the magnitude of the sensing current.

18. (New) A method of determining a magnitude of a sensing current to be supplied to an electromagnetic transducer, comprising:

supplying an electric current of a first current value to the electromagnetic transducer;

determining a physical quantity appearing in the electromagnetic transducer based on the electric current of the first current value;

supplying an electric current of a second current value, different from the first current value, to the electromagnetic transducer;

determining the physical quantity appearing in the electromagnetic transducer based on the electric current of the second current value;

determining a variation in temperature of the electromagnetic transducer based on the change in the physical quantity; and

determining the magnitude of the sensing current based on a determined variation in temperature of the electromagnetic transducer.

19 (New) The method of determining according to claim 18, further comprising determining an expected lifetime of the electromagnetic transducer based on the variation in temperature when determining the magnitude of the sensing current.

20. (New) The method of determining according to claim 18, wherein the variation in temperature is determined by utilizing a temperature coefficient, and the temperature coefficient has a value depending on a material included in the electromagnetic transducer.

21. (New) A method of determining a magnitude of a sensing current to be supplied to an electromagnetic transducer, comprising:

supplying an electric current of a first current value to the electromagnetic transducer;

calculating a first electric resistance value of the electromagnetic transducer based on a first voltage value appearing in the electromagnetic transducer in response to supply of the electric current of the first current value;

supplying an electric current of a second current value, different from the first current value, to the electromagnetic transducer;

calculating a second electric resistance value of the electromagnetic transducer based on the first and second electric resistance values; and

determining the magnitude of the sensing current based on a calculated quantity of variation in temperature of the electromagnetic transducer.

22. (New) The method of determining according to claim 21, further comprising determining an expected lifetime of the electromagnetic transducer based on the quantity of variation

in temperature of the electromagnetic transducer when determining the magnitude of the sensing current.

23. (New) The method of determining according to claim 21, wherein the variation in temperature is calculated in accordance with the following equation:

$$\Delta T = \frac{R - R_{ini}}{R_{ini}} \gamma$$

where ΔT indicates the variation in temperature, R_{ini} indicates the first electric resistance value, R indicates the second electric resistance value and γ indicates a temperature coefficient.

24. (New) The method of determining according to claim 21, wherein the variation in temperature is calculated by utilizing a temperature coefficient, and the temperature coefficient has a value depending on a material included in the electromagnetic transducer.

25. (New) A computer-readable storage medium containing program instructions for determining a magnitude of a sensing current to be supplied to an electromagnetic transducer, comprising:

computer program code causing a computer to supply an electric current of a first current value to the electromagnetic transducer;

computer program code causing a computer to determine a physical quantity appearing in the electromagnetic transducer based on the electric current of the first current value;

computer program code causing a computer to supply an electric current of a second current value, different from the first current value, to the electromagnetic transducer;

computer program code causing a computer to determine the physical quantity appearing in the electromagnetic transducer based on the electric current of the second current value; and

computer program code causing a computer to determine the magnitude of the sensing current based on a change of the physical quantity.

26. (New) The computer-readable storage medium according to claim 25, wherein said storage medium is a memory chip incorporated in a magnetic disk drive.

27. (New) The computer-readable storage medium according to claim 25, further containing program instructions comprising:

computer program code causing a computer to calculate a first electric resistance value of the electromagnetic transducer based on a first voltage value appearing in the electromagnetic transducer in response to supply of the electric current of the first current value;

computer program code causing a computer to calculate a second electric resistance value of the electromagnetic transducer based on a second voltage value appearing in the electromagnetic transducer in response to supply of the electric current of the second current value; and

computer program code causing a computer to calculate a quantity of variation in temperature of the electromagnetic transducer based on the first and second electric resistance values in determining the magnitude of the sensing current.

28. (New) The computer-readable storage medium according to claim 27, wherein said storage medium is a memory chip incorporated in a magnetic disk drive.